

visits, hospitalization or death. The objective of this study was to perform a systematic review to identify predictors of these adverse outcomes among patients who present to the ED with hyperglycemia. **Methods:** Electronic searches of Medline and EMBASE were conducted for studies published in English between the years 1946 and June 2017. Studies with patients presenting to the ED with hyperglycemia were eligible for inclusion. Both adult and pediatric populations were included, as were diabetic and non-diabetic patients. Two reviewers independently screened all titles and abstracts for relevance to the research question. If consensus could not be reached, full-length manuscripts were reviewed. For any discrepancy, a third reviewer was consulted, and disagreement was resolved through discussion. Study quality was assessed using the Newcastle-Ottawa Quality Assessment Scale. Study- and patient-specific data were then extracted and presented descriptively in the systematic review. **Results:** Thirteen observational studies were included, with a combined total of 664,829 patients. The studies scored between 5 to 8 on the Quality Assessment Scale out of a possible total of 8. Predictors of adverse outcomes included patients in both older and younger (<25) age groups, history of diabetes, multiple comorbidities, patients requiring insulin, sepsis and hyperlactatemia, access to a family physician, a sentinel hyperglycemia visit in the past month, and triage glucose level >20 mmol/L. Protective factors included no admissions in the past year, care from a diabetes team while in hospital, systolic blood pressure between 90-150 mmHg and heart rate >110 bpm. **Conclusion:** This systematic review found eight predictors and four protective factors for adverse outcomes in patients presenting to the ED with hyperglycemia. These factors should be considered for easier identification of higher-risk patients for adverse outcomes in order to guide management and follow-up.

**Keywords:** hyperglycemia, emergency department, risk factors

#### P141

##### **Predictive validity of the Regional Paramedic Program for Eastern Ontario (RPPEO) prehospital sepsis notification tool**

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**Introduction:** Early recognition of sepsis can improve patient outcomes yet recognition by paramedics is poor and research evaluating the use of prehospital screening tools is limited. Our objective was to evaluate the predictive validity of the Regional Paramedic Program for Eastern Ontario (RPPEO) prehospital sepsis notification tool to identify patients with sepsis and to describe and compare the characteristics of patients with an emergency department (ED) diagnosis of sepsis that are transported by paramedics. The RPPEO prehospital sepsis notification tool is comprised of 3 criteria: current infection, fever &/or history of fever and 2 or more signs of hypoperfusion (eg. SBP <90, HR 100, RR24, altered LOA). **Methods:** We performed a review of ambulance call records and in-hospital records over two 5-month periods between November 2014 February 2016. We enrolled a convenience sample of patients, assessed by primary and advanced care paramedics (ACPs), with a documented history of fever &/or documented fever of 38.3°C (101°F) that were transported to hospital. In-hospital management and outcomes were obtained and descriptive, t-tests, and chi-square analyses performed where appropriate. The RPPEO prehospital sepsis notification tool was compared to an ED diagnosis of sepsis. The predictive validity of the RPPEO tool was calculated (sensitivity, specificity, NPV, PPV). **Results:** 236 adult patients met the inclusion criteria with the following characteristics: mean age 65.2 yrs [range 18-101], male 48.7%, history of sepsis 2.1%, on antibiotics 23.3%, lowest mean systolic BP 125.9,

treated by ACP 58.9%, prehospital temperature documented 32.6%. 34 (14.4%) had an ED diagnosis of sepsis. Patients with an ED diagnosis of sepsis, compared to those that did not, had a lower prehospital systolic BP (114.9 vs. 127.8,  $p=0.003$ ) and were more likely to have a prehospital shock index >1 (50.0% vs. 21.4%,  $p=0.001$ ). 44 (18.6%) patients met the RPPEO sepsis notification tool and of these, 27.3% (12/44) had an ED diagnosis of sepsis. We calculated the following predictive values of the RPPEO tool: sensitivity 35.3%, specificity 84.2%, NPV 88.5%, PPV 27.3%. **Conclusion:** The RPPEO prehospital sepsis notification tool demonstrated modest diagnostic accuracy. Further research is needed to improve accuracy and evaluate the impact on patient outcomes.

**Keywords:** paramedicine, sepsis notification, prehospital

#### P142

##### **Diagnosis of pulmonary embolism in the Canadian context: clinical review findings from a health technology assessment**

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**Introduction:** Pulmonary embolism (PE) is a diagnostic challenge, since it shares symptoms with other conditions. Missed diagnosis puts patients at a risk of a potentially fatal outcome, while false positive results leave them at risk of side effects (bleeding) from unnecessary treatment. Diagnosis involves a multi-step pathway consisting of clinical prediction rules (CPRs), laboratory testing, and diagnostic imaging, but the best strategy in the Canadian context is unclear. **Methods:** We carried out a systematic review of the diagnostic accuracy, clinical utility, and safety of diagnostic pathways, CPRs, and diagnostic imaging for the diagnosis of PE. Clinical prediction rules were studied by an overview of systematic reviews, and pathways and diagnostic imaging by a primary systematic review. Where feasible, a diagnostic test meta-analysis was conducted, with statistical adjustment for the use of variable and imperfect reference standards across studies. **Results:** The Wells CPR rule showed greater specificity than the Geneva, but the relative sensitivities were undetermined. Application of a CPR followed by with D-dimer laboratory testing can safely rule out PE. In diagnostic test accuracy meta-analysis, computed tomography (CT) (sensitivity 0.973, 95% CrI 0.921 to 1.00) and ventilation/perfusion single-photon emission CT (VQ-SPECT) (sensitivity 0.974, 95% CrI 0.898 to 1.00) had the highest sensitivity) and CT the highest specificity (0.987, 95% CrI 0.958 to 1.00). VQ and VQ-SPECT had a higher proportion of indeterminate studies, while VQ and VQ-SPECT involved lower radiation exposure than CT. **Conclusion:** CPR and D-dimer testing can be used to avoid unnecessary imaging. CT is the most accurate single modality, but radiation risk must be assessed. These findings, in conjunction with a recent health technology assessment, may help to inform clinical practice and guidelines.

**Keywords:** diagnostic imaging, pulmonary embolism, systematic review

#### P143

##### **An exploratory study to understand relationship between gameplay experience and observed actions**

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**Introduction:** The GridlockED game is a serious game aimed at teaching junior learners about flow and organization in the emergency

department(ED). With serious games, the mechanism of learning is thought to be via the gameplay experience. Objectives built into gameplay are aimed at teaching players about a specific concept; in this case, we hoped to teach players about interprofessional collaboration and basic mechanics that drive flow in the ED. However, before a player can be taught, he or she must be engaged and have a positive gameplay experience. From the GridlockED gameplay, we aim to explore how a players gameplay experience related to observed actions while playing the game, including participating in decision making and keeping the team organized. **Methods:** From April-August 2017, participants were invited to play 4 turns of a GridlockED game session. They were video recorded during gameplay. After playing the game, they were surveyed using the previously derived Game Experience Questionnaire (GEQ) to measure their gameplay experience. The videos were reviewed by two research team members (SH, EJ), tallying various observed game actions. We conducted Pearson correlation between players GEQ total score and their observed actions. **Results:** A total of 32 participants (13 attendings, 5 senior residents, 10 junior residents, and 4 nurses) played the game. The average total GEQ was 67.2/132 (SD = 10.7), suggesting most players had a moderately good gameplay experience. The total GEQ score correlated with component subscores within the questionnaire. Overall observed activity correlated well with each observed action subtype. However, the GEQ total score did not correlate significantly with the total observed action (Pearsons  $r=0.18, p=0.32$ ). GEQ total score was found to be moderately correlated to an observation that a player participated in determining strategy during gameplay ( $r=0.36, p=0.04$ ). There was a moderate negative correlation between determining strategy during gameplay and teaching about the game ( $r=-0.37, p=0.04$ ) or emergency medicine concepts ( $r=-0.47, p<0.01$ ). **Conclusion:** The GEQ is internally consistent, but does not have a strong relationship to observed actions, suggesting that game experience does not necessarily correlate with observable actions. This suggests that players may be intellectually stimulated or engaged without necessarily completing any observable actions during gameplay.

**Keywords:** education, simulation, serious games

#### P144

##### Assessment of the quality of evidence presented at the Canadian Association of Emergency Physicians annual meeting over a five-year period (2013-2017)

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**Introduction:** The CAEP annual meeting presents the latest evidence for clinical practice, but there has not yet been an appraisal of the abstracts presented at this conference. Therefore, we sought to evaluate the level of evidence of research presented at the annual meeting, and assess for trends over a five-year period (2013-2017). **Methods:** We conducted a scoping review that included all CAEP abstracts from 2013-2017, obtained through the Canadian Journal of Emergency Medicine. Two reviewers assessed eligibility and extracted data from abstracts individually, with conflicts resolved by a third reviewer. Qualitative research was excluded. Extracted data included type of presentation (ex. oral, poster), sample size, study design and type of study (therapeutic, prognostic, diagnostic, education, quality improvement, or systems-wide/economic analyses research). A level of evidence (LOE) was assigned using the 2011 Oxford Centre for Evidence-Based Medicine criteria. **Results:** Abstracts from 2014-2017 have been analyzed thus far, 1090 of which were eligible and 990 included. Inter-rater

agreement for screening and data extraction was high (value 0.87 and 0.84 respectively). Systems-wide/economic analyses research was the predominant type of study (28.6%, 283/990), followed by therapeutic (19.9%, 197/990) and education (19.9%, 195/990). The mean LOE was 2.81 (95% CI 2.77,2.85). The highest proportion of studies were of level III evidence (77.7%, 769/990), followed by level II (9.6%, 95/990) and level I evidence (7.8%, 77/990). 72.1% (124/172) of all level I and II abstracts were presented in 2016 and 2017. A significant change in LOE between years was evident ( $p<0.0001$ , chi-squared). The greatest proportion of level I and II abstracts were lightning oral (41.9%, 72/172), followed by posters (36.0%, 62/172). The best average LOE was observed for lightning oral (2.64, 95% CI 2.56, 2.72), with the poorest average LOE witnessed for moderated posters (2.90, 95% CI 2.83, 2.97). A significant difference was present in mean LOE between types of presentations ( $p<0.0001$ , one-sided ANOVA). **Conclusion:** The majority of abstracts were level III evidence. The lightning oral sessions had the greatest proportion of level I and II evidence presented. Recent years of the conference have also seen the presentation of a greater number of level I and II evidence, which may suggest a shift towards generating and disseminating higher level evidence in emergency medicine.

**Keywords:** evidence-based medicine, level of evidence, quality of evidence

#### P145

##### The role of audit and feedback in the ED setting: are physicians able to accurately predict their own practice?

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**Introduction:** Prior research has shown that audit and feedback (A &F) can be an effective tool for practice change. However, questions remain about how to optimize A&F. The objectives of this project were to determine if: 1) there are differences in practice between physicians who do, and do not, consent to receive a confidential report on their practice and; 2) if there is a relationship between consenting physicians self-predicted and actual practice. **Methods:** This was a prospective, cross-sectional study embedded in a larger quality improvement (QI) initiative to align physician practice with best evidence in the emergency department (ED) care of infants with bronchiolitis. All physicians practicing in the ED of a tertiary care pediatric hospital were offered the opportunity to consent to receive an individual, confidential data report on their practice. Prior to receiving their data, consenting physicians completed a survey which asked them to predict the proportion of bronchiolitic patients for whom they ordered diagnostic tests or treatments. We used chi-squared testing to compare the proportion of consenting and non-consenting physicians whose diagnostic test (Chest X-ray (CXR), viral study) and treatment (steroid, Ventolin) ordering was above the median for all ED physicians. We used Pearsons correlation to assess the relationship between consenting physicians self-predicted and actual practice. **Results:** 56% (37/66) of physicians consented to receive a data report. The median proportion of patients with an x-ray ordered was 20%, 63% of non-consenters were above the median, compared to 36% of consenters ( $X^2(1, N=66)=4.91, p=0.03$ ). For viral testing, 31% of patients had a test ordered, with 50% of non-consenters and 50% consenters above the median ( $X^2(1, N=66)=0, p=1$ ); 11% of patients had steroids ordered, with 53% of non-consenters and 47% of consenters above the median ( $X^2(1, N=66)=0.24, p=0.621$ ); and 18% of patients had Ventolin ordered, with 60% of non-consenters and 42% of consenters above the median ( $X^2(1, N=66)=2.2, p=0.138$ ). There was a